41. For metals, an analog of this statement called Sievert's law is preferred, while the Sechenov [SECH-uh-nawf] equation can adjust for the effect of electro·lytes on the constant used in this law. When administering anesthesia to surgical patients, the Ostwald coefficient is incorporated into this law. Breathalyzers use this law to determine blood alcohol content. The decompression sickness experienced by scuba divers is a consequence of this law. When the constant in this law equals vapor pressure, this law becomes Raoult's [rah-oohl'z] law. This law explains why an open carbonated drink goes flat. Name this law stating that the concentration of gas dissolved in a liquid is directly proportional to its pressure.

Answer: <u>Henry</u>'s law

42. One of this author's title characters plays the lead role in the operetta *La blonde Vénus* and was a minor character from an earlier novel he wrote, *L'Assommoir [lah-sohm-war]*. That character becomes a prostitute, and she and her son die from smallpox. In another novel by this author, Souvarine [soo-vah-reen] is a Russian anarchist in the northern French town of Montsou [mont-soo], where Étienne Lantier [et-yen lahnt-yay] works in a coal mine. Both of those novels are part of this author's *Les Rougon-Macquart [leh roo-gaw "mock"-war]* series. Name this French author of *Nana* and *Germinal [zhair-mee-nahl]*.

Answer: Émile(-Édouard-Charles-Antoine) <u>Zola</u> [ay-meel zoh-lah]

43. This person was appointed to lead the National Rifle Association's Subcommittee on International Affairs in 2011, and he then participated by video in a 2013 roundtable forum on gun rights organized by Maria Butina [boo-TEE-nah]. Even though this person once said "There is no United Nations", he became the U.S. ambassador to the U.N. in 2005. In 2018, this person met with his Russian counterpart Nikolai Patrushev to discuss arms control and Iran's role in Syria. In October 2018, this person got into a heated argument with John Kelly just outside the Oval Office. Name this person who in 2018 succeeded H. R. McMaster and Michael Flynn to become the U.S. National Security Advisor.

Answer: John (Robert) <u>Bolton</u>

44. This person used the name "David D. Newsom" when he entered the United States for treatment of lymphatic cancer. Much earlier, this person gave shares in state-owned industries to landlords in exchange for land reform as part of his White Revolution. Those changes were instituted after Operation Ajax strengthened this monarch, whose prime minister had tried to dissolve parliament. Allen Dulles returned this person to his country in 1953 after the overthrow of Mohammad Mossadegh [moh-sad-eg]. The leader who eventually overthrew this person supported the taking of fifty-two Americans as hostages. Name this final monarch, or Shah, of Iran.

Answer: Mohammad Reza Shah <u>Pahlavi</u> [prompt on the <u>Shah</u> or <u>Reza</u>]

45. The "relative" form of this quantity minus 1 equals the magnetic susceptibility. A specific instance of this quantity is divided by 4π ["4 pi"] and multiplied by an integral in the Biot-Savart [BEE-oh sah-VAR] law. This value equals the magnetic flux density within a material divided by the strength of the magnetizing field. Name this quantity whose value for a vacuum equals $4\pi \times 10^{-7}$ ["4 pi times 10 to the minus 7"] henries per meter, and which is represented by the Greek letter mu [myoo].

Answer: magnetic <u>permeability</u> [accept relative <u>permeability</u> or vacuum <u>permeability</u> or <u>permeability</u> of free space]

Check the score.

46. In one novel by this author, Jane Gould writes that Dr. Alfred Goodricke can be a character witness for her. This author followed Jane's narrative with the narrative of the tombstone of Laura, Lady Glyde, whose maiden name was Fairlie. The title character in that novel, Anne Catherick, is Laura's half-sister and escaped from an asylum. In another novel by this author, Rosanna Spearman drowns in quicksand after becoming a suspect in the theft of the title object. That title object, given by Colonel Herncastle to his niece Rachel Verinder, is a diamond taken from India. Name this author of *The Woman in White* and *The Moonstone.*

Answer: (William) Wilkie <u>Collins</u>

47. A Matthew Bourne production of a ballet by this composer replaces most of the female roles with men and makes the main antagonist a "private secretary". A ballet by this composer includes a third-act pas de quatre [pah deh kwaht-ruh] that includes four individual variations for the gold, silver, sapphire, and diamond fairies. In that ballet by this composer, a harp cadenza opens a number in which four suitors each present a woman with a flower. The Lilac Fairy protects a character who dances the "Rose Adagio" in a ballet by this composer. A character almost kills a beautiful maiden with a crossbow in a ballet by this composer that was revived by Marius Petipa, and in which the antagonist transforms his daughter to look like a black version of the love interest. The sorcerer Rothbart curses the love interest of Prince Siegfried, Odette, in a ballet by this composer. Name this composer of *Sleeping Beauty* and *Swan Lake.*

Answer: Pyotr Ilyich <u>Tchaikovsky</u> [or Peter Ilich <u>Tchaikovsky</u>]

48. In one tradition, this person's chief disciple, Gautama Swami, was told by Indra to visit this figure to learn the meaning of a verse he couldn't explain. This person *succeeded* a man who protected serpents during one of his rebirths and who is always depicted with a seven-headed serpent hood. This figure is normally depicted as sitting in a contemplative pose with the sign of a lion beneath him. This figure sat under a *sala* tree next to a river to achieve a state called *kevala jnana* [keh-VAH-lah NYAH-nah]. This person originated the doctrine of Anekantavada [ah-NAY-kahn-tah-WAH-duh], or many-sided reality, and succeeded Parshvanatha [parsh-vah-NAH-tah] as his religion's sage. This person's teachings were compiled by his disciples into the Agamas [ah-GAH-mahz]. This person's teachings were derived from many doctrines from earlier Tirthankaras [teer-TAHN-kah-rahz], such as *ahimsa* [ah-HEEM-sah], or non-violence. Name this 24th and last prophet of Jainism.

Answer: <u>Mahavira</u> [or <u>Vardhamāna</u>]

49. This leader's advisors were upset by the promotion of John Hill, who was the brother of Lady Masham. This monarch, who had Sarah Churchill and her husband the Duke of Marlborough exiled from court, secured a monopoly on the slave trade to the Spanish colonies known as the Asiento. When this person died, there was an attempt by the Jacobites to put James Francis Edward Stuart on the throne. This monarch was succeeded by George I via the 1701 Act of Settlement, which required a Protestant monarch. A law passed during this ruler's reign united England and Scotland into Great Britain. Name this monarch who helped to create the 1707 Acts of Union and was the last from the House of Stuart.

Answer: Queen <u>Anne</u>

50. This result can be found by multiplying a particular number times a transpose of cofactors; those cofactors are found by multiplying minors by powers of -1. When the input is orthogonal, this result is the same as the transpose. Another way to find this result is to augment the input with the identity, then perform Gauss-Jordan elimination and take the right half of the output. This result's eigenvalues ["EYE-gun-values"] are the reciprocals of the input's eigenvalues, and its determinant is the reciprocal of the input's determinant, so this result can only be found for an input whose determinant is nonzero. Name this type of matrix that can be multiplied by its source to get the identity matrix, and which is denoted with a superscript -1.

Answer: matrix <u>inverse</u> or <u>inverse of a matrix</u> or <u>matrix inversion</u> [accept just <u>inverse</u> after "(identity) matrix"]

This is the end of the packet.